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Hierarchical multispectral image classification based on self organized maps

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Abstract

One of the problems in the thematic interpretation of the remote sensor (RS) data is the processing of the sets of multispectral, multydate images. The problem is that when we try to compare two and more RS image, we have to rectify their geometry and correct atmospheric effects. While the geometric correction could be done with any precision, the atmospheric correction for a set of images is a very complex task, and it could not be solved in a common case. We propose a new approach, based on the artificial neural networks, for a stable RS images classification and interpretation without the atmospheric correction. That approach, using the Kohonen's Self-Organized Maps (SOM), has been realized as a part of the ScanEx image processing technology in a computer program NeRIS (Neural Raster Interpretation System). The Sammon's mapping of that SOM classification from the p-dimensional input image space to the 2-dimensional points on a plane (whereby the distances between the mapped vectors tend to approximate to distances of the input vectors), was used for hierarchical classification and stable thematic interpretation of the RS images.